Patent Claims:

1. A sensor comprising at least one sensor unit shaped as a cantilever, said sensor unit comprises a capture surface, and a piezoresistive element with a pair of wires for applying an electrical field over the piezoresistive element, the distance between the wires along the piezoresistive element being defined as the length of the piezoresistive element, the piezoresistive element has a longitudinal direction and a transverse direction along the length of the piezoresistive element when an electrical field is applied over the piezoresistive element and the piezoresistive element is subjected to a stress, the longitudinal direction is defined as a direction which is one of the axis x, y or z of a coordinate system and wherein there is a stress composant and a current composant, the transverse direction is perpendicular to said longitudinal direction, said piezoresistive element being of an anisotropic material, and being arranged so that the numerically value of the sum of the longitudinal piezoresistive coefficient π_l and the transverse piezoresistive coefficient π_t along at least 25 % of the length, such as at least along 50 % of the length such as at least along 80 % of the length, such as at least along 90 % of the length, such as at least along 95 % of the length of the piezoresistive element being at least $10^{-10}Pa^{-1}$ x P, such as 2 x $10^{-10}Pa^{-1}$ x P, such as 3 x $10^{-10}Pa^{-1}$ x P, such as 4 x $10^{-10}Pa^{-1}$ x P, wherein P is the piezoresistance factor, and wherein the piezoresistive coefficients π_l and π_t are determined as composants in the coordinate system used to determine the longitudinal direction.

2. A sensor according to claim 1 wherein the piezoresistive element being of doped single crystalline silicon.

3. A sensor according to any one of the claims 1 and 2 wherein the sensor unit comprises a single crystalline silicon piezoresistive element encapsulated in a single crystalline silicon electrically shield.

4. A sensor according to any one of the preceding claims wherein the piezoresistive element is encapsulated in a shield of a non-conducting material selected from the group consisting of nitrides, such as silicon nitride and tantalum nitride, non-conducting polymers, such as octafunctional epoxidized novalac, metal oxides, such as aluminium oxide, ceramics, diamond films, silicon carbide, tantalum oxide, silicon, glass, mixtures and combinations thereof.

5. A sensor according to any one of the preceding claims wherein said sensor unit is shaped as a cantilever extending in a length and linked in both of its endings to form a cantilevered bridge.

6. A sensor according to any one of the preceding claims wherein the sensor unit has a thickness in the interval of 0.05 μm to 5 μm, such as in the interval of 0.1 μm to 4 μm, such as in the interval of 0.2 μm to 1 μm.

7. A sensor according to any one of the preceding claims wherein the piezoresistive element has a thickness in the interval of 10 nm to 500 nm, such as in

the interval of 50 nm to 300 nm, such as in the interval of 100 nm to 200 nm.

8. A sensor according to any one of the preceding claims wherein the piezoresistive element being U shaped, latter shaped, meander shaped or V shaped.

9. A sensor according to any one of the preceding claims wherein the piezoresistive element is n-type single crystalline silicon.

10. A sensor according to claim 9 wherein said n-type silicon piezoresistive element being orientated along the <110> direction of silicon.

11. A sensor according to claim 9 wherein said n-type silicon piezoresistive element being orientated along the <100> direction of silicon.

12. A sensor according to any one of the preceding claims wherein the piezoresistive element being of single crystalline silicon doped with one or more of the ions: boron ion, phosphorous ion, arsenic ion.

13. A sensor according to any one of the preceding claims wherein the piezoresistive element being of single crystalline silicon doped with 10^{16} ions/cm^3 or more, such as 10^{17} ions/cm^3 or more, such as 10^{18} ions/cm^3 or more, such as 10^{19} ions/cm^3 or more, such as 10^{20} ions/cm^3 or more.

14. A sensor according to any one of the preceding claims wherein the piezoresistive element being of single crystalline silicon doped with 10^{21} ions/cm^3 or

less, 10^{20} ions/cm^3 or less, such as 10^{19} ions/cm^3 or less, such as 10^{18} ions/cm^3 or less, such as 10^{17} ions/cm^3 or less.

15. A sensor according to any one of the preceding claims, wherein the sensor unit comprises two major surfaces, and at least a part of one or both of the major surfaces constitutes the capture surface, and the piezoresistive element has a neutral plan distance of 50 nm or less, such as 100 nm or less, such as 200 nm or less, such as 400 nm or less, such as 1 µm or less, such as 3 µm or less, which neutral plan distance is measured as the shortest distance between the middle plan of the piezoresistive element, defined as the middle plan through the piezoresistive element which is parallel to the neutral plan, and the neutral plan, which neutral plan is defined as the plan along which the sum of the compressive and tensile stress acting on the piezoresistive element is as close to zero as possible.

16. A sensor according to any one of the preceding claims, wherein the sensor unit comprises two major surfaces, which major surfaces partly or totally constitute a capture surface.

17. A sensor according to any one of the preceding claims wherein said sensor comprises one or more fluid chambers, said one or more sensor units partly or totally protrudes into said fluid chamber(s) so that a fluid applied in the chamber is capable of coming into contact with part of the surface of the sensor unit(s).

18. A sensor according to any one of the preceding claims wherein said fluid chamber or chambers is/are in the form of interaction chamber(s), preferably comprising a channel for feeding a fluid into the interaction chamber(s).

19. A sensor according to any one of the preceding claims wherein said sensor is adapted for use in detection of a substance in a liquid.